

REMARKS/ARGUMENTS

The Examiner is thanked for discussing with Applicants' representative the reasons for his rejections of the claims and his rationale for alleging that Sisson (U.S. Patent No. 3,568,206) [Sisson '206] discloses each and every feature in Independent Claims 1 and 11. Several differences between the present application and Sisson '206 were pointed out to the Examiner. At least some of these differences are presented below in the discussion of the current Office Action

Claims35 USC § 112 ¶ 2 Rejections of Claims 14 – 16

The Office Action rejected Claims 14 – 16 under 35 USC § 112 ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because Claim 14 recites the limitation “the radiator of planar form” in lines 1 - 2. There is insufficient antecedent basis for this limitation in the claim.

Applicants have amended Claim 14 to clarify that “the radiator” is further characterized as being “of planar form”.

The Examiner is requested to remove the 35 USC § 112 ¶ 2 Rejection of Claims 14 – 16. In light of the foregoing arguments and amendments to the claims, the Examiner is respectfully requested to allow Claims 14 – 16.

35 USC § 102(b) Rejection of Claims 1, 3, 11 and 12

The Examiner has rejected Claims 1, 3, 11 and 12 under 35 USC § 102(b) as being anticipated by Sisson (U.S. Patent No. 3,568,206) [Sisson '206]. The Office Action states that “Sisson et al. teaches in figures 1-3 a planar antenna ...”.with all the features of Claim 1.

The Applicants disagree with the conclusion of the Office Action that Sisson '206 teaches each and every feature of Claim 1, and Traverse. A declaration by Koichi MIKAMI [Mikami-Declaration], a co-inventor of the present application, is submitted to show that a person knowledge in the art would conclude that Sisson '206 does not disclose each and every feature of the present application.

The antenna disclosed in Sisson '206 is designed to solve a specific problem and has several special features. These special features prevent Sisson '206 from anticipating, or being used in combination with another reference to make obvious, the Claims in the present application. There are several features of Sisson '206 that one of ordinary skill in the art would reasonably conclude were different from the present claims, at least because:

- (1) the antenna is a miniature transmission line loaded slot antenna (column 1, line 5);
- (2) the spiral conductor must be 0.25λ long (column 2, lines 16 -17);
- (3) the length of probe 6 is about 0.01λ (column 2, line 39);
- (4) the antenna diameter must be approximately 0.05λ (Column 1, lines 8 – 9); and
- (5) there is essentially no radiation from the spiral conductor 7 (column 2, line 11).

Sisson '206 -- Slot antenna, diameter 0.05 wavelength, spiral conductor

Sisson '206 states “*The present invention relates to antennas, and more particularly, to a miniature transmission line loaded slot antenna. Conventional annular slot antennas are approximately one-half wavelength in diameter. It is an object of the present invention to provide a similar antenna having a diameter of only approximately 0.05 wavelength.*” (column 1, lines 4 – 9).

Figures 1 and 2 shows “*a substantially square metal cavity is provided, having a bottom surface 2, sides 4 and upper surfaces 5. A conductive probe 6 is electrically connected to the bottom surface 2 and projects upwardly to the plane of upper surfaces 5. The center of a spiral conductor 7 is connected to the upper end of probe 6, The spiral conductor 7 is wound substantially in the plane of the upper surfaces 5 of the cavity, and an annular space S acting as a slot is left between the outer spiral turns and the cavity sides 4. The diameter D of slot S is only approximately 0.05 wavelength. The diameter D is nominally either the outside diameter of the slot when the latte is round or the longest side of a rectangular slot when the slot has square corners. It is the same as the diameter of the cavity from sidewall to sidewall.*” (Column 1, lines 18 – 32).

In light of the foregoing description, the cavity 1 indicated in Sisson '206 is a cavity resonator because it is one-half wavelength in diameter, rather than a “reflector [1]” as alleged in the Office Action. Furthermore, the antenna described in Sisson '206 is an annular slot antenna

(column 1, line 6) loaded with an annular slot in a cavity resonator, and the cavity does not function as a reflector [Mikami-Declaration paragraphs 13 and 14]. In addition, the diameter “D” of slot S is 0.05 wavelength, and the diameter D is not the width of the slot S but the diameter of the cavity, which is clearly shown in Figure 2. Thus, Sisson ‘206 does not teach that a space between a spiral conductor 7 and the cavity is 0.05 wavelength.

The antenna described in Sisson ‘206 has a fundamentally different function in its operation from the present invention, planar antenna fitted with a reflector [Mikami-Declaration paragraphs 8 - 10].

Additionally, the Examiner contends that the “spiral conductor” in Sisson ‘206 can be a “radiator” as in the Claims of the present application. However, Sisson '206 clearly states the "spiral conductor" is not a radiating element.

"The image theory of a conductor above a conducting ground plane is well known in the art. The spiral conductor 7 of the present invention with its image below the ground plane can be treated as a two-wire transmission line which terminates the ends of the 6 probe and its image. Since current flow in the image conductor of the transmission line is opposite to that in the conductor itself, the cancellation occurs and there is essentially no radiation from the transmission line (7 spiral conductor.)" (column 2, lines 4 – 12)
[emphasis added]

Sisson'206 – separation is 0.01 wavelength

The Office Action states the “prescribed separation (D)” in the present application is equivalent to “the depth of the cavity 1, i.e. the length of probe 6” and the length of probe 6 can have a “ range from 0.06λ to 0.15λ ”. The Office Action cites “Col. 2, lines 38 - 41” as giving support for this conclusion; however this section of Sisson ‘206 discloses that the length of probe 6 is about 0.01 wavelength and does not disclose a range of “ 0.06λ to 0.15λ ”. During the conservation with the Examiner, he contended that the phrase “but this value may vary considerably according to the antenna efficiency desired and other parameters” gives support for any length of the probe, including the disclosed range in the Claims of the present application.

This contention is not supported by Sisson '207; since the disclosed antenna would not function as designed if the length of probe 6 were " 0.06λ to 0.15λ " [Mikami-Declaration paragraphs 11 and 12].

Figure 1 (Appendix A) shows the claimed antenna [partial view] (Figure 1A – dotted lines show 0.06λ and 0.15λ) in the present application and the antenna disclosed in Sisson '206 (Figure 1B) drawn to scale. Additionally, Figure 1 shows the antenna in Sisson '206 if the length of probe 6 was 0.06λ (Figure 1C) and 0.15λ (Figure 1D). As can be seen in Figure 1, if the antenna in Sisson '206 had the length of probe 6 from 0.06λ to 0.15λ , it would not function as designed.

Sisson '206 – Cavity

Sisson '206 does not disclose a "reflector" and nothing in the disclosed slot antenna reflects the radiation. The Office Action alleges that the cavity resonator is a "reflector"; however this is not supported by the specification of Sisson '206.

The Applicant disagrees with the assessment in the Office Action that Feature 1 in Sisson '206 is equivalent to the reflector (Feature 11a) in the present application.

Claim 1

As discussed above, Sisson '206 does not teach each and every feature of Claim 1, and therefore it does not anticipate Claim 1.

Claim 3

The Office Action further alleges that Sisson '206 teaches in figures 1-3 the planar antenna fitted with a reflector [1] of claim 1, characterized in that the radiator [7] is a loop. A careful examination of Figures 1 – 3, shows that the antenna is a "slot antenna", feature 1 is a "cavity resonator", and feature 7 is a "spiral conductor". Specifically, Sisson '206 does not disclose a planar antenna, a reflector or a loop radiator.

Claim 11

The Office Action further alleges that Sisson '206 teaches in Figures 1 - 3 "both side sections of a rectangular metallic plate are bent substantially at right-angles towards the radiator".

A careful examination of Figures 1 – 3, shows that the cavity is produced by folding a cruciform piece of metal, rather than a rectangular metallic plate. It is geometrically impossible to fold a rectangular shape into a shape similar to the cavity in Sisson ‘206, without removing a square piece of material from each corner.

Therefore, Sisson ‘206 does not teach “both side sections of a rectangular metallic plate are bent substantially at right-angles towards the radiator”

The Examiner is requested to remove the 35 USC § 102(b) Rejection of Claims 1, 3, 11 and 12. Several differences have been described between Sisson ‘206 and the claims in present the application, and any one of which removes the reference from anticipating the claims. In light of the foregoing arguments and amendments to the claims, the Examiner is respectfully requested to allow Claims 1, 3, 11 and 12.

35 USC § 103(a) Rejection of Claims 6, 8, 9 and 14 - 16

The Examiner has rejected Claims 6, 8, 9 and 14 - 16 under 35 USC § 103(a) as being unpatentable over Sisson ‘206 in view of Jeong-Kun et al. (U.S. Patent No. 6,606,067) [Jeong-Kun ‘067]. The Office Action states “Sisson et al. teaches every feature of the claimed invention ... except for a double loop element wherein the width of the upper and lower sides is formed wider than that of the other sides.”

The Applicants disagree with the conclusion of the Office Action and submit that the combination of Sisson ‘206 and Jeong-Kun ‘067 do not disclose each and every feature of Claims 6, 8, 9 and 14 – 16, and Traverse.

The arguments against Sisson ‘206 disclosing each and every feature of the claimed planar antenna are presented above, and the disclosure of Jeong-Kun ‘067 does not cure the deficiencies in Sisson ‘206.

The Examiner is requested to remove the 35 USC § 103(a) Rejection of Claims 6, 8, 9 and 14 - 16. In light of the foregoing arguments and amendments to the claims, the Examiner is respectfully requested to allow Claims 6, 8, 9 and 14 - 16.

No Disclaimers or Disavowals

Although the present communication may include alterations to the claims, the Applicants are not conceding in this application that previously pending claims are not patentable. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that the Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

Conclusion

Claims 1, 3, 4, 6, 8, 9, 11 - 16 are Pending. Claims 3, 12, and 14 are Currently amended. Claims 2, 5, 7, and 10 are Canceled. No New Matter was entered with these amendments. Applicants respectfully request the entrance of the amendments.

Applicants have endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, arguments in support of the patentability of the pending claim set are presented above. In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested and it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

No additional fees are believed due; however, the Commissioner is authorized to charge any additional fees now and in the future which may be due, including any fees for additional extension of time, or credit overpayment to credit card information.

Date: March 17, 2008

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APPENDIX I

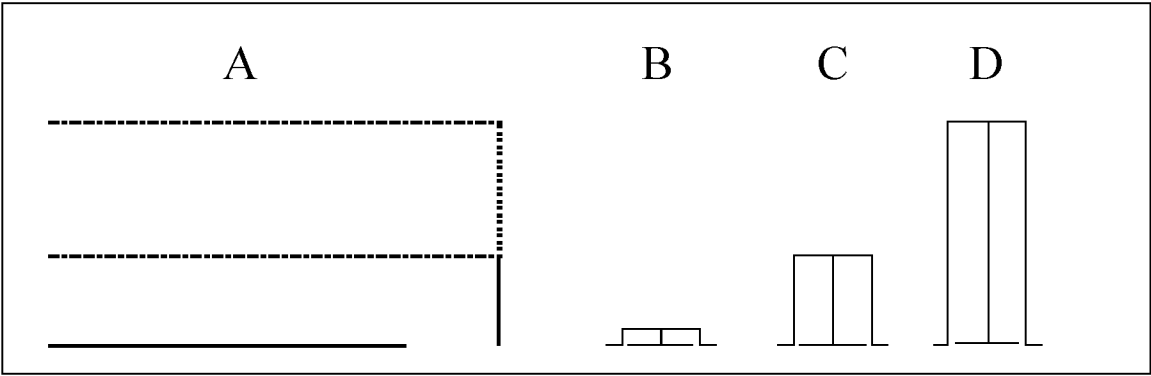


FIGURE 1